Problem Set 1

1. Suppose the market demand curve for a product is given by

$$Q^D_{mkt} = 1000 - 10P$$

and the market supply curve is given by

$$Q^S_{mkt} = -50 + 25P$$

   (a) What are the equilibrium price and quantity

   (b) What is the inverse form of the demand curve?

2. Suppose that the individual demand curves for two individuals are given by

$$Q_1^D = \begin{cases} 200 - 10P & \text{if } P \leq 20 \\ 0 & \text{otherwise} \end{cases} \quad \text{and} \quad Q_2^D = \begin{cases} 100 - 10P & \text{if } P \leq 10 \\ 0 & \text{otherwise} \end{cases}$$

and that the supply curve for the firm is given by

$$Q_{mkt}^S = \begin{cases} 20P - 100 & \text{if } P \geq 5 \\ 0 & \text{otherwise} \end{cases}.$$

Find the market equilibrium (keeping in mind that the market price may be such that only 1 consumer will be willing to stay in the market).

3. Suppose that when Snarfburger originally charged a price of \$5 for their burger, they sold $1,000$ burgers per week. Thinking that they could potentially make more money by charging a higher price, they raised their price by 50 cents. After raising their price, they sold 800 units per week.

   (a) Find the price elasticity of demand for Snarfburgers.

   (b) Write a sentence interpreting the price elasticity of demand you calculated.

Table 1: Estimates of the Price Elasticity of Demand for Selected Food Products

Product	Estimated $\epsilon_{Q,P}$
Cigars	-0.756
Canned and cured seafood	-0.736
Fresh and frozen fish	-0.695
Cheese	-0.595
Ice cream	-0.349
Beer and malt beverages	-0.283
Bread and bakery products	-0.220
Wine and brandy	-0.198
Cookies and crackers	-0.188
Roasted coffee	-0.120
Cigarettes	-0.107
Chewing tobacco	-0.105
Pet food	-0.061
Breakfast cereal	-0.031

Pagoulatos & Sorensen (1986)

(a) Which good is the most inelastic?

(b) Which food product is more inelastic, Cheese or Roasted coffee?

(c) Is Ice cream considered an elastic good?

(d) Write a sentence interpreting the elasticity for Cookies and Crackers.

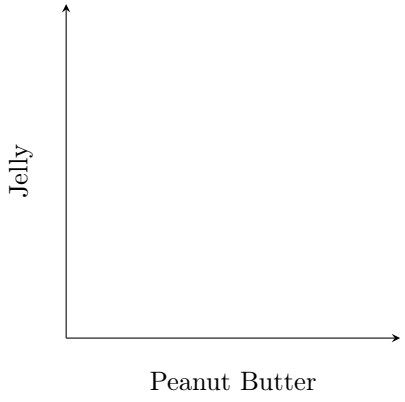
4. With peanut butter on the x-axis, and jelly on the y-axis, draw a set of at least two indifference curves to represent the following types of preferences:

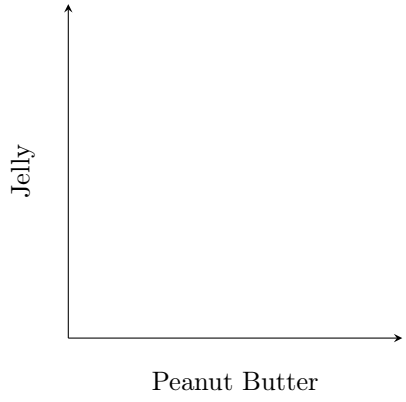
   (a) I like both peanut butter and jelly, and always get the same additional satisfaction froman ounce of peanut butter as I do from 2 ounces of jelly.

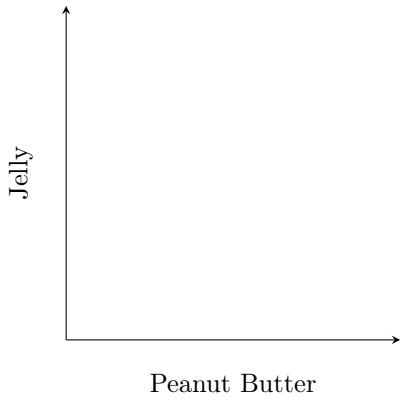
   (b) I like peanut butter, but neither like nor dislike jelly.

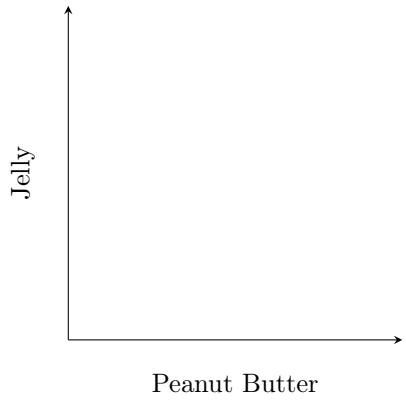
   (c) I like peanut butter, but dislike jelly.

   (d) I like peanut butter and jelly, but I only want 2 ounces of peanut butter for every ounce of jelly.









5. For each of the utility functions below, answer the following questions.

   (i) Is the assumption that more is better satisfied for both goods?

   (ii) What is the marginal utility for each of the goods?

   (iii) Does the marginal utility of x diminish, remain constant, or increase as the consumer buys more x? Explain.

   (iv) What is the marginal rate of substitution (MRS) of x for y?

   (v) Is the $MRS_{x,y}$ diminishing, constant, or increasing as the consumer substitutes more x for y along an indifference curve?

   (a) $U(x, y) = 10x - 0.5x^2 + 20y - y^2$

   (b) $U(x, y) = 6x^{1/3}y^{2/3}$

(c) $U(x, y) = xy^2$

(d) $U(x, y) = \sqrt{x} + 2\sqrt{y}$